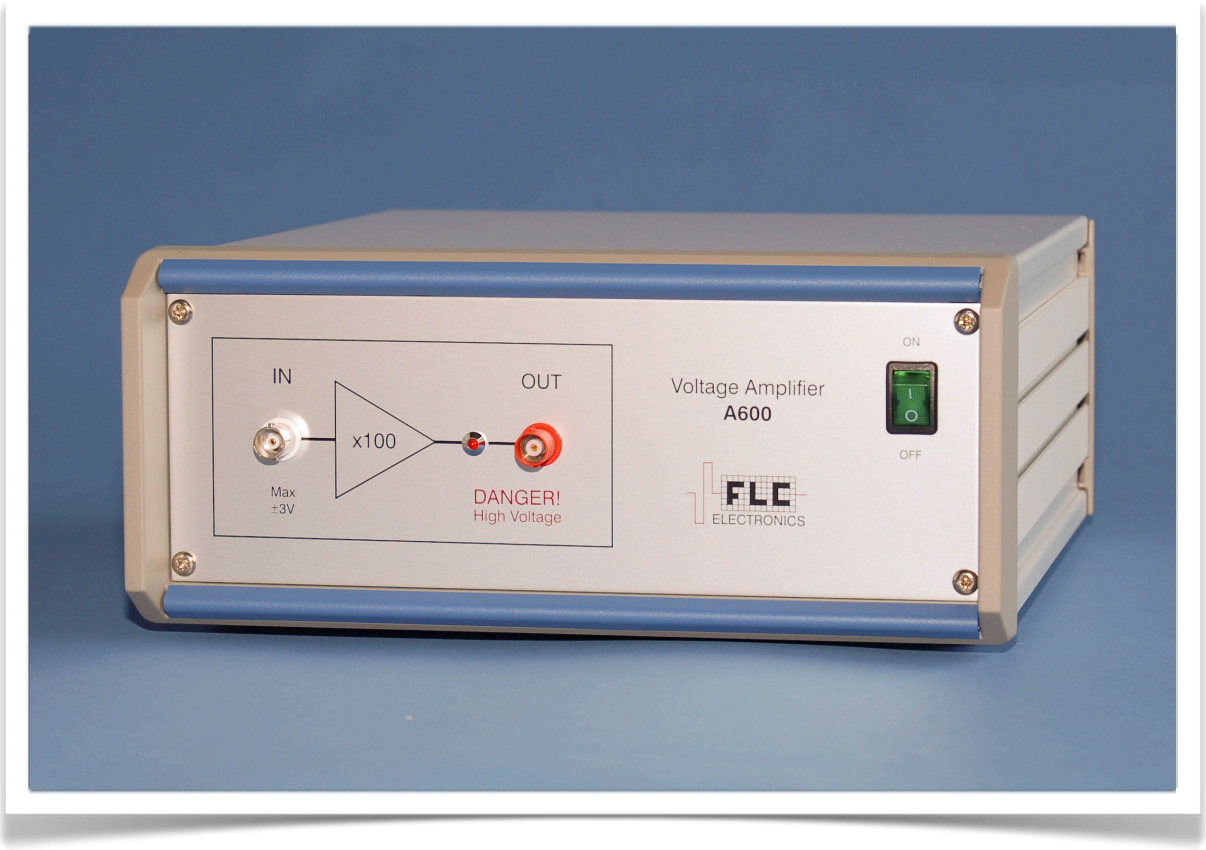
BROADBAND LINEAR AMPLIFIER

Model A600



HIGH VOLTAGE

600 Vpp
75 mA

FIXED GAIN

100x

BROADBAND

DC to ca 250 kHz
FULL SCALE

LOW OUTPUT IMPEDANCE

<0.1 Ω

HIGH SLEW RATE

300 V/µs

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GENERAL DESCRIPTION

The **A600** is a general purpose linear amplifier designed for laboratory use. It is based on a fast high-voltage operational amplifier with a feedback network chosen to give a voltage amplification of 100 times. Any function or arbitrary waveform generator with low output impedance and output voltage up to ±10 V can be used as an input device.

The amplifier outputs high voltage signals at high frequency. It is, thus, imperative for the safe operation that the user understands the possibilities and limitations of the instrument. Isolated BNC output connector is used to comply with safety requirements.

INPUT AMPLITUDE

The amplitude of the input signal should normally be kept within **±3 V**. The input protection network limits the signal amplitude delivered to the power amplifier to a safe value. It also effectively cuts accidental spikes and overshoots. However, large and prolonged overvoltage at the input may blow the microfuse in the input protection circuit.

Keep input signals within ±3 V range.

Never connect any high voltage output to any input or output of the instrument!

TROUBLESHOOTING

Problem	Condition	Solution
No output	Power switch does not lit	Check the mains fuse located on the back
No output or very small, distorted signal	Power switch OK	Check the input microfuse located inside the device.
Constant high voltage output	Without any input signal	Amplifier failure. Contact flce@flce.se

You should suspect a blown input microfuse if the output is about zero or the amplifier is producing a very low voltage, distorted copy of the input signal (due to the capacitive coupling through the blown fuse).

Spare microfuses are provided inside the instrument. They look like small metal cans and are placed in white holders. The resistance of a good fuse is in the order of 46 ohm. It is imperative to disconnect the power cable and wait at least a minute before opening the case. If possible, contact info@flce.se for advice.

LOAD

The amplifier is intended to drive resistive and/or small capacitive loads. The maximum capacitive load depends on the slew rate of the amplifier. The slew rate is normally set at the factory to 300 V/µs which is appropriate for a small load (for example 5 kΩ in series with 100 pF). Due to the output current limit (75 mA) the slew rate at higher load of 300 pF drops to ca 200 V/µs rising edge and ca 130 V/µs falling edge. This load includes the capacitance of the connection cable (ca 100 pF/m for a standard coaxial cable). Increasing the capacitive load causes overshoot to appear. If a larger capacitive load is required, and the overshoot is not acceptable, then the slew should be reduced accordingly. Such an adjustment may be performed by qualified personnel and the factory should be contacted for advice (preferably by email info@flce.se). Inside the cabinet exist hazardous voltage levels and the amplifier circuit is sensitive to static discharge.

FLC Electronics AB recommends to monitor the output signal of the amplifier with an oscilloscope. It is then important to use a low capacitive probe with a division factor of at least 1/100 (please note also the maximum voltage that can be connected to the oscilloscope input and that can be handled by the probe).

The amplifier cannot be used to drive an inductive load.

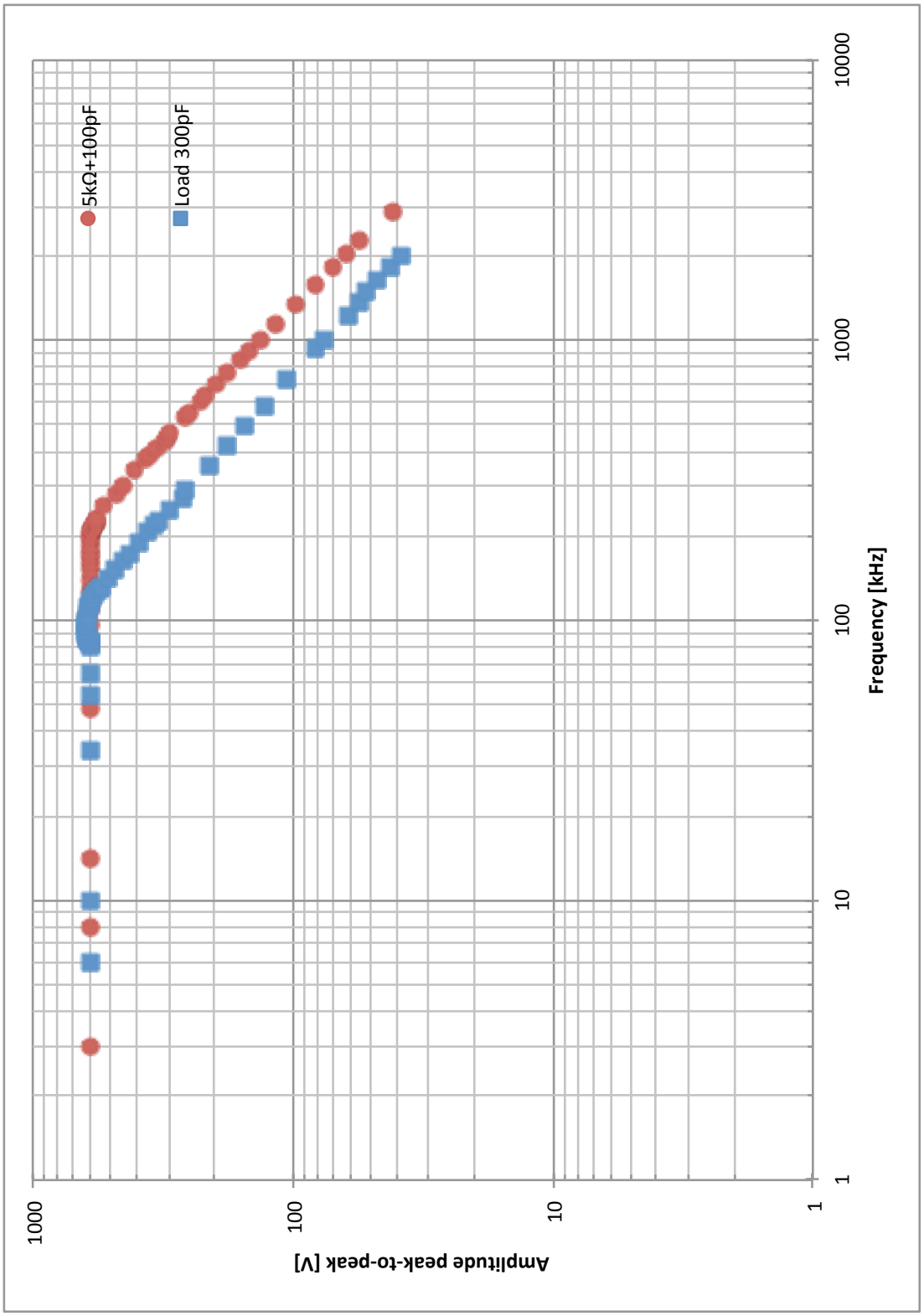
The continuous output current limit is 75 mA and the output power limit is 30 W. The output is equipped with a current limiting circuit that withstands accidental short-circuits. Prolonged short-circuiting may result in overheating the amplifier.

Overloading the output may cause an overshoot which might be dangerous for connected devices.

The amplifier may be overheated when the output is short-circuited for a long time.

FREQUENCY RESPONSE

The graph below shows full-scale frequency response of **A600** with small load (5 kΩ in series with 100 pF, red circles) and with 300 pF pure capacitive load (blue squares):



SUMMARY OF TECHNICAL DATA

Bandwidth:		DC to about 250 kHz at 600 Vpp
Amplification:		100 times
Load:	type	resistive || capacitive
Impedance:	input	1 MΩ || 30 pF, custom values possible
	output	<0.1 Ω in the linear mode
Voltage:	input	nominal ±3 V
Current:	output	maximum 75 mA
Slew Rate:	output	ca 300 V/µs without load
		(different adjustments available on request)
Input protection fuse		15 mA (Littelfuse, part number 272.015)
		one spare fuse provided inside the instrument,
		additional fuses available from Littelfuse
		resellers or from FLC Electronics AB.
Operating Ambient Temperature:		0°C to 30°C
Storage Temperature:		0°C to 60°C
Relative Humidity:		up to 90% (operation)
		30% to 50% (storage)
Power Requirements:		100/110 V or 220/230 V, 50/60 Hz
Fuse:		100/110 V: 3.15 A (slow),
		220/230 V: 2 A (slow)
Dimensions (H/W/L):		112 x 255 x 316 (mm)
Weight:		4 kg
Country of Origin:		Sweden

Note: Specifications apply to instruments operating at 23°C±5°C ambient temperature after 15 min. warm-up time. Due to ongoing product development, specifications are subject to change without notice.

WARNING It is not allowed to connect the 100...230V AC line power input of the amplifier to DC-AC converters or solid state AC generators with non-sinusoidal output.

Data sheet revision date: 30 May, 2013

WARRANTY

FLC Electronics warrants that this product will be free from defects in materials and workmanship for a period of two years from the date of the shipment.

If any such product proves defective during this warranty period, FLC Electronics, at its option, either will repair the defective product without charge for parts and labour, or will provide a replacement for the defective product. In order to obtain service under this warranty, Customer must notify FLC Electronics of the defect before the expiration of the warranty period and make suitable arrangements for the performance of the service. Customer shall be responsible for packing and shipping the defective product to the service center designed by FLC Electronics, with shipping charges prepaid. FLC Electronics shall pay for the return of the product to the Customer if the shipment is to a location within the country in which the FLC Electronics service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or inadequate maintenance and care. FLC Electronics shall not be obligated to furnish service under this warranty:

- to repair damage resulting from attempts by personnel other than FLC Electronics representatives to install, repair or service the product;
- to repair damage resulting from improper use or connection to incompatible equipment;
- to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

This warranty is given by the FLC Electronics with respect to this product in lieu of any other warranties, expressed or implied. FLC Electronics and its vendors disclaim any implied warranties of merchantability or fitness for a particular purpose. FLC Electronics' responsibility to repair or replace defective products is sole and exclusive remedy provided to the customer for breach of this warranty. FLC Electronics and its vendors will not be liable for any indirect, special, advance notice of the possibility of such damages.

The instrument may generate hazardous voltage levels! It should be operated by qualified personnel only. The instrument is to be used in normal room temperature and humidity.

The manufacturer cannot be held responsible for damage to any device connected to the instrument. It is recommended that samples or equipment sensitive to voltage spikes are disconnected from the high-voltage outputs when turning the power to the instrument ON or OFF.

I M P O R T A N T

Inside the amplifier case exist dangerous voltage levels.

The amplifier cannot be used to drive an inductive load.

The instrument cannot be powered from a DC-AC converter nor from a solid-state AC generator with non-sinusoidal output.

Loads sensitive to voltage transients should be disconnected from the amplifier during power-up and power-down.

Never connect the output to the input of the amplifier!

The amplifier may be overheated if the output is short-circuited for a long time.

It is recommended to monitor the output signal of the amplifier on the oscilloscope.

EC Declaration of Conformity

We

FLC Electronics AB
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declare under sole responsibility that the

Voltage Amplifier A600

meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility (EMC) and Low Voltage Directive 73/23/EEC (LVD). Compliance was demonstrated to the following standards as listed in the official Journal of the European Communities:

EN 50081-1	**Generic Emissions**
EN 55022	Conducted emission (interference voltage), class B
EN 55022	Radiated emission (electric field), class B
EN 50082-1	**Generic Immunity**
EN 61000-4-4	Electrical fast transient/burst
EN 61000-4-2	Electrostatic discharge
EN 61000-4-3	Radiated E-fields (radio frequency)
EN 61010-1:2001	**Electrical Safety**

Tomasz Matuszczyk, PhD
Technical Director
FLC Electronics AB

June 04, 2007